

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2000-280600

(43)Date of publication of application : 10.10.2000

(51)Int.Cl.

B41M 5/00

(21)Application number : 11-095846

(71)Applicant : TOMOEGAWA PAPER CO LTD
SEIKO EPSON CORP

(22)Date of filing : 02.04.1999

(72)Inventor : ISHIKAWA TAKAYUKI
KUBOTA NOBUHIRO
TSUCHIDA MINORU
ASAI SHIGEKI
YOSHIMOTO TAKESHI
IWAMOTO KIYOSHI
SUGIYAMA ATSUSHI
ONISHI HIROYUKI
SANO YUKARI**(54) INK JET RECORDING MEDIUM****(57)Abstract:**

PROBLEM TO BE SOLVED: To enhance image quality, e.g. print density, ink absorbance, image preservation (light fastness, waterproofness, moistureproofness, and the like) by adding a specified water soluble substance, as a component for enhancing color stability, to an ink receiving layer containing a pigment and a binder resin.

SOLUTION: The ink jet recording medium being employed in an ink jet recording system using an aqueous ink has a support applied with an ink receiving layer at least containing a pigment and a binder resin. The ink receiving layer is added a component for enhancing color stability, i.e., a partially saponified PVA having degree of saponification in the range of 85.0-73.0 mol.% and degree of polymerization in the range of 300-1500. Alternatively, a acetoacetyl group modified PVA having degree of saponification in the range of 92.0-73.0 mol.%, degree of polymerization in the range of 300-1500 and the degree of acetoacetyl group modification in the range of 6.5-0.5 mol.% is added as the component for enhancing color stability thus enhancing print density, ink absorbance, image preservation, color stability, and the like.

LEGAL STATUS

[Date of request for examination] 14.06.2001

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3458068

[Date of registration] 01.08.2003

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's
decision of rejection]

[Date of extinction of right]

*** NOTICES ***

JPO and NCIP are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.***** shows the word which can not be translated.

3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The medium for ink jet record which the ink absorbing layer which contains a pigment and binder resin at least on a base material is the medium for ink jet record which comes to carry out coating, and is characterized by for whenever [saponification] containing and the partial saponification PVA of 300-1500 containing [polymerization degree] 85.0-73.0-mol% as an improvement component in color stability in this ink absorbing layer.

[Claim 2] The medium for ink jet record which is a medium for ink jet record by which it comes to carry out coating of the ink absorbing layer which contains a pigment and binder resin at least on a base material, and is characterized by the aceto acetyl group denaturation PVA whenever [300-1500, and aceto acetyl group denaturation / whose] 92.0-73.0-mol % and a degree of polymerization is 6.5-0.5-mol % for whenever [saponification] containing as an improvement component in color stability in this ink absorbing layer.

[Claim 3] The medium for ink jet record which the ink absorbing layer which contains a pigment and binder resin at least on a base material is the medium for ink jet record which comes to carry out coating, and is characterized by for the viscosity of 10.0-40.0-mol % and 20% water solution contain [the degree of acetalization], and the 35.0-65.0-mol % polyvinyl acetal resin which carried out carboxylic acid denaturation contain [3000-6000cps and a residual hydroxyl group] as an improvement component in color stability in this ink absorbing layer.

[Claim 4] The medium for ink jet record by which the ink absorbing layer which contains a pigment and binder resin at least on a base material is the medium for ink jet record which comes to carry out coating, and molecular weight is characterized by the polyethylene-glycol derivative of 200-6000 containing as an improvement component in color stability in this ink absorbing layer.

[Claim 5] The medium for ink jet record by which the ink absorbing layer which contains a pigment and binder resin at least on a base material is the medium for ink jet record which comes to carry out coating, and an HLB value is characterized by the secondary alcohol ethoxy rate system surface active agent of 8.0-14.0 containing as an improvement component in color stability in this ink absorbing layer.

[Claim 6] The medium for ink jet record which the ink absorbing layer which contains a pigment and binder resin at least on a base material is the medium for ink jet record which comes to carry out coating, and is characterized by two or more sorts in the improvement component in color stability of a publication containing as an improvement component in color stability in this ink absorbing layer at above-mentioned claims 1-5.

[Claim 7] The medium for ink jet record according to claim 1 to 3 characterized by the above-mentioned binder resin being the above-mentioned improvement component in color stability, and a common component.

[Claim 8] The medium for ink jet record according to claim 1 to 7 characterized by the above-mentioned improvement component in color stability containing 1.0 to 25.0% of the weight to the total solid content of the above-mentioned ink absorbing layer.

[Claim 9] The medium for ink jet record according to claim 1 to 8 characterized by having a glossiness adjustment layer in the outermost surface of the above-mentioned ink absorbing layer.

[Claim 10] The above-mentioned glossiness adjustment layer is a medium for ink jet record according

to claim 9 characterized by having ten or more 60-degree specular gloss.

[Translation done.]

*** NOTICES ***

JPO and NCIP are not responsible for any damages caused by the use of this translation.

- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.***** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[The technical field to which invention belongs] This invention relates to the medium for ink jet record, and relates to image recording grace, such as printing concentration, ink absorptivity, and image shelf life, and the amelioration technique of color stability especially.

[0002]

[Description of the Prior Art] Since, as for the ink jet recording method which carries out output printing by water color ink at the medium for record, a high speed, the low noise, and colorization have the various features that an image is clear in addition to easy **, spread is increasing in recent years. That to which the laminating of the ink absorbing layer which had the property which makes an image clear though water color ink is fully absorbed in the front face of base materials, such as paper which mainly comes to mill paper pulp, as a medium for record which reflects the features of this ink jet recording method effectively was carried out is offered. Generally that ink absorbing layer makes the pigment represented by the silica an ink acceptance agent, and a laminating is carried out by applying the coating liquid which distributed this pigment in binder resin, such as the carboxyl group denaturation PVA (polyvinyl alcohol), on the surface of a base material.

[0003]

[Problem(s) to be Solved by the Invention] By the way, it is used for professional youths, such as color proofreading (for example, trial printing in a platemaking phase), more often as the common ink jet printer as an ink jet recording method is still cheaper in recent years, it is supplied and skillful color will become familiar. In such a case, the demand level to color stability becomes high not to mention image recording grace, such as printing concentration, ink absorptivity (high-speed printing nature), and image shelf lives (lightfastness, a water resisting property, moisture resistance, etc.). Therefore, the present condition is that it is an indispensable condition to satisfy the demand to these properties enough when expanding the application of the medium for ink jet record. Namely, this invention aims at offering the medium for ink jet record by which each of many properties of image recording grace and color stability, such as the above-mentioned printing concentration, ink absorptivity, and image shelf life, is demonstrated with a high level.

[0004]

[Means for Solving the Problem] The result of having repeated various examination about the medium for ink jet record by which this invention persons come to carry out coating of the ink absorbing layer which contains a pigment and binder resin at least on a base material, By making an ink absorbing layer contain the water-soluble specific matter as an improvement component in color stability It succeeded in excelling in image recording grace, such as printing concentration, ink absorptivity, and image shelf lives (lightfastness, a water resisting property, moisture resistance, etc.), and obtaining the good medium for ink jet record of color stability, and resulted in completion of this invention. In addition, the color stability said by this invention is a property which the value of L* of the color immediately after target record, a*, and b* is not changed in accordance with time amount, namely, reaches the value of L* of a target color, a*, and b* by the shortest time amount, and if it puts in another way, it will be defined as the property which color difference ΔE after the time amount progress after recording as the color immediately after record does not expand in accordance with

time amount. As an improvement component in color stability made to contain, it is one or more sorts in partial saponification PVA, the aceto acetyl group denaturation PVA, the polyvinyl-acetal resin that carried out carboxylic-acid denaturation, a polyethylene-glycol derivative, and a secondary alcohol ethoxy rate system surfactant, and the description of this invention is in the point of having specified these components further. Hereafter, the component of the medium for ink jet record of this invention is explained in full detail.

[0005] (1) As a base material with which coating of the base material ink absorbing layer is carried out Wood pulp, such as recycled pulp, such as mechanical pulp, such as chemical pulp, such as LBKP and NBKP, GP, PGW, RMP and TMP, CTMP, and CMP, corrosion gage point, and DIP, Synthetic-fiber pulp, such as a polyethylene fiber, is used as a principal component. Or to this The various additives currently used for usual paper making, such as a pigment and a sizing compound and a fixing agent, a yield improver, and a paper reinforcing agent, are mixed if needed [one or more sort], and the stencil paper manufactured with paper manufacture equipments, such as a Fortlinear paper machine, a cylinder machine, and a twin-wired paper machine, is used. Furthermore, the paper which gave size press and an anchor coat layer to this stencil paper by starch, PVA, casein, gelatin, etc., the art paper which performed baryta paper-ization which is used for the photographic printing paper, coat paper, cast coated paper, etc. can be used.

[0006] Although an ink absorbing layer is applied to such a base material, a base material can be further processed with calender equipments, such as a machine calender, TG calender, and a software calender, before that for the purpose of making the improvement in smooth nature or the coating nature of an ink absorbing layer, or the aesthetic property of printing paper etc.

[0007] Moreover, the film material which consists of synthetic resin and these resin, such as the thing porosity-ized from the beginning as approach from the charge of a laminate material to a base material top so that air permeability might not go up too much or the polyolefine processed so that it might laminate by the very thin film and might porosity-ize with heating etc., polyethylene, polypropylene, polyester, nylon, rayon, and polyurethane, can also be used.

[0008] In order to pull out the design nature of the medium for ink jet record concerned about the smoothness of the coating side of a base material to the maximum extent, it is desirable to make it as high as possible by the approach which does not spoil the rigidity of a base material. As a numeric value of concrete smoothness, the smoothness in the smoothness/J.TAPPI-A method test method specified to "J. TAPPI paper pulp test-method No.5" is 1500 seconds or more still more preferably 500 seconds or more more preferably 100 seconds or more. Moreover, about the rigidity of a base material, it is too soft or there is a possibility that a problem may arise in the feed process to ** past ***** and a printer conversely. Therefore, it is most desirable that it is desirable that the rigidity in 20 degrees C in the gar rhe method rigidity test method specified to "J. TAPPI paper pulp test-method No.40" and 65%RH is in the range of 400-3600mN as concrete rigidity in a lengthwise direction, and is in the range of 200-1800mN in a longitudinal direction, it is in the range of 800-2500mN in a lengthwise direction, and it is in the range of 400-1000mN in a longitudinal direction.

[0009] (2) As a pigment contained in the ink absorbing layer of ink absorbing layer A. pigment this invention, insoluble or one or more sorts of pigments of general common knowledge which are poorly soluble are used for water. For example, precipitated calcium carbonate, whiting, a kaolin, talc, A calcium sulfate, a barium sulfate, a titanium dioxide, a zinc oxide, zinc sulfide, Zinc carbonate, a satin white, silicic acid ARUMIUMU, diatomaceous earth, a calcium silicate, A magnesium silicate, synthetic amorphous silica, colloidal silica, a colloidal alumina, Pseudo-boehmite, an aluminum hydroxide, an alumina, a lithopone, a zeolite, Organic pigments, such as white inorganic pigments, such as hydrated halloysite, a magnesium carbonate, and a magnesium hydroxide, a styrene system plastics pigment, an acrylic plastics pigment, polyethylene, a microcapsule, a urea-resin, and melamine resin, etc. are mentioned.

[0010] The principal component of an ink absorbing layer usually consists of white pigments. As the white pigments, a viewpoint excellent in drying [of ink jet ink], absorptivity, etc. to a porous inorganic pigment is desirable, for example, porous composition amorphous silica, a porosity magnesium carbonate, a porosity alumina, etc. are mentioned. Moreover, what satisfies the both sides of printing quality and shelf life (indoor shelf life and lightfastness over direct rays) is desirable, and porous

amorphous silica or a porosity alumina a specific surface area 200 – about two 600 g/m sedimentation type and gel type is suitable for it.

[0011] B. As main binder resin contained in the ink absorbing layer of binder resin this invention, one or more sorts are used in consideration of image shelf life etc. out of cellulosics, such as starch derivatives, such as PVA(s), such as partial saponification PVA, the carboxylic-acid denaturation PVA, and the silyl denaturation PVA, oxidization starch, and etherification starch, a carboxymethyl cellulose, and hydroxyethyl cellulose, casein, gelatin, soybean protein, etc. In these, partial saponification PVA and the carboxylic-acid denaturation PVA are suitable from excelling in an adhesive property and image shelf life. since these [PVA] affect image shelf lives, such as lightfastness, by the difference in a miscibility with other raw materials -- whenever [saponification] -- desirable -- 90.0–78.0–mol % -- it is more preferably [85.0–73.0 mol% of] good. Moreover, in order to secure an adhesive property, about 1100 to 1800 thing is suitable for polymerization degree.

[0012] Moreover, if it is in binder resin, in order to raise a water resisting property and moisture resistance In the range at the sacrifice of lightfastness, maleic-anhydride resin, a styrene-butadiene copolymer, Conjugated diene system copolymer emulsions, such as a methyl methacrylate-butadiene copolymer, Acrylic polymer emulsions, such as a polymer of acrylic ester and methacrylic ester, or a copolymer, The functional-group denaturation polymer emulsion by functional-group content monomers, such as a carboxyl group of vinyl system polymer emulsions, such as an ethylene-vinylacetate copolymer, or these various polymers, Melamine resin, a urea-resin, polymethylmethacrylate, polyurethane resin, It is desirable to use together with main binder resin, such as the partial saponification PVA which mentioned above copolymerization resin system emulsions, such as an unsaturated polyester resin, a vinyl chloride vinyl acetate copolymer, a polyvinyl butyral, and an alkyd resin. Especially in these concomitant use binder resin, since the ethylene-vinylacetate copolymer resin emulsion and the polyurethane resin emulsion are effective in improvement in image shelf life (lightfastness, a water resisting property, moisture resistance), they are more suitable as concomitant use binder resin.

[0013] Combination of the pigment which an ink absorbing layer is made to contain, and binder resin is chosen in the range in which the balance of image recording grace, such as reinforcement of an ink absorbing layer, reinforcement of the glossiness adjustment layer mentioned later, and ink absorptivity, is maintained. Pigment:binder resin =3:7–1:1 and main binder resin =55:45–19:1 binder resin:concomitant use of is done are desirable, and, specifically, pigment:binder resin =4:6–1:1 and main binder resin =3:1–3:2 binder resin:concomitant use of is done are more desirable. If there are too many pigments, since the adhesive strength of binder resin is insufficient, when destruction arises in an ink absorbing layer or the laminating of the glossiness adjustment layer is carried out to it if needed at the time of manufacture, destruction will arise in this glossiness adjustment layer, and it will become the cause of a productivity slowdown. Conversely, if there is too much binder resin, when air permeability goes up, deterioration of image recording grace, such as ink absorptivity, will be caused.

[0014] C. The greatest description of the medium for ink jet record of improvement component this invention in color stability is in the point of having made one or more sorts in partial saponification PVA, the aceto acetyl group denaturation PVA, the polyvinyl-acetal resin that carried out carboxylic-acid denaturation, a polyethylene-glycol derivative, and a secondary alcohol ethoxy rate system surfactant containing, as an improvement component in color stability in an ink absorbing layer, as mentioned above. Hereafter, the improvement component in these color stability is explained in full detail.

[0015] C-1. the partial saponification PVA partial saponification PVA -- whenever [saponification] -- 85.0–73.0–mol % -- desirable -- 80.0–78.0–mol % and polymerization degree -- 300–1500 -- use the thing of 800–1300 preferably.

C-2. the aceto acetyl group denaturation PVA aceto acetyl group denaturation PVA -- whenever [saponification] -- 92.0–73.0–mol % -- desirable -- 92.0–78.0–mol % and a degree of polymerization -- 300–1500 -- desirable -- whenever [800–1300, and aceto acetyl group denaturation] -- 6.5–0.5–mol % -- use 4.0–1.5–mol % of a thing preferably. In addition, less than [0.5 mol %] is equivalent to the above-mentioned partial saponification PVA, if whenever [saponification] is 73.0–85–mol %, and as for color stability, whenever [aceto acetyl group denaturation] becomes good. Moreover, color stability

will be satisfied, if whenever [aceto acetyl group denaturation] is 6.5-0.5-mol % even if it is the partial saponification PVA whenever [whose / saponification] exceeds 85.0-mol %. Therefore, in the aceto acetyl group denaturation PVA, the thing whenever [whose / saponification] is 85.0-73.0-mol % and whenever [aceto acetyl group denaturation / whose] is 6.5-0.5-mol % is the optimal as an ingredient for obtaining good color stability.

C-3. the polyvinyl-acetal resin which carried out carboxylic-acid denaturation and which carried out polyvinyl-acetal resin carboxylic-acid denaturation -- the degree of acetalization -- 10.0-40.0-mol % -- desirable -- the viscosity of 20.0-30.0-mol % and 20% water solution -- 3000-6000cps -- desirable -- 4000-5000cps and a residual hydroxyl group -- 35.0-65.0-mol % -- use 40.0-55.0-mol % of a thing preferably.

C-4. a polyethylene-glycol derivative polyethylene-glycol derivative -- molecular weight -- 200-6000 -- use the thing of 200-2000 preferably.

C-5. a secondary alcohol ethoxy rate system surface-active-agent secondary alcohol ethoxy rate system surface active agent -- an HLB (hydrophile-lipophile balance) value -- 8.0-14.0 -- use the thing of 10.0-12.0 preferably.

[0016] If it is in a polyethylene-glycol derivative and a secondary alcohol ethoxy rate system surfactant among the above-mentioned improvement components in color stability, since it will have a bad influence on color stability if it deviates from the above-mentioned range, it is not desirable.

Moreover, if it is in the polyvinyl-acetal resin which carried out partial-saponification-PVA(ing) and aceto-acetyl-group-denaturation-PVA(ing) and carboxylic-acid denaturation, since it will have a bad influence not only on color stability but on image shelf life (mainly lightfastness) if it deviates from the above-mentioned range, it is not desirable. At least one sort can contain the improvement component in these color stability in an ink absorbing layer, and it can also contain two more or more sorts.

[0017] Moreover, if it is possible to use about the polyvinyl-acetal resin which carried out to partial-saponification-PVA and to aceto-acetyl-group-denaturation-PVA and carboxylic-acid denaturation as binder resin (especially main binder resin) which constitutes an ink absorbing layer and it puts in another way, it is making for binder resin to be an improvement component in color stability, and a common component into the suitable gestalt of this invention. Thereby, reduction-ization of the class of ingredient to be used is attained. And the content to the inside of the ink absorbing layer of the above-mentioned improvement component in color stability has 3.0 - 15.0 preferably good % of the weight 1.0 to 25.0% of the weight to the total solid content of an ink absorbing layer. In addition, in 1100-1300, and the aceto acetyl group denaturation PVA, 4000-5000cps has [in / in a degree of polymerization / 1100-1500, and the polyvinyl-acetal resin that carried out carboxylic-acid denaturation] the desirable degree of polymerization in the partial saponification PVA from a viewpoint which secures an adhesive property with a base material when using binder resin as the improvement component in color stability, and a common component viscosity of 20% water solution. When binder resin and the improvement component in color stability are used as a common component, all over an ink absorbing layer, it is made to contain 20 to 50% of the weight, and is used.

[0018] D. The drugs for light-fast improvement, a color and a pigment fixing agent, a pigment agent, a thickener, a fluid amelioration agent, a defoaming agent, foam suppressor, a release agent, a foaming agent, a penetrating agent, a coloring color, a color pigment, a fluorescent brightener, antiseptics, a deck-watertight-luminaire-ized agent, a hardening agent, etc. can be suitably blended with other additive ink absorbing layers as other additives if needed.

[0019] In this invention, the additive which does the photofading prevention effectiveness of an image so is defined as the above-mentioned drugs for light-fast improvement by adding to an ink absorbing layer. As these drugs for light-fast improvement, the water-soluble metal salt more than divalent, an ultraviolet ray absorbent, an antioxidant, etc. are mentioned. Moreover, as the above-mentioned color fixing agent, a cationic color fixing agent is used suitably, and ingredients, such as a polyamine resin system and a quarternary-ammonium-salt resin system, are mentioned as this cationic color fixing agent. The synergistic effect can be considered in the drugs for the improvement in these lightfastness, and a cationic color fixing agent. in order [then,] to raise image recording grace more in an ink absorbing layer -- the drugs:cationic color fixing agent for light-fast improvement -- desirable -- 4:1-1:1 -- more -- desirable -- the solid content ratio of 3:2-1:1 -- using together -- further -- the

additive of pigment + binder resin:others -- desirable -- 19:1-4:1 -- it is good to use it by the solid content ratio of 9:1-4:1 more preferably.

[0020] Moreover, the above-mentioned ultraviolet ray absorbent and an anti-oxidant have a multiple-valued carboxylic acid, the liquid type which made at least the function part esterify (about an ultraviolet absorption part and an antioxidizing function part), and the distributed type more desirable than the fine particles of the type kneaded to polyolefin resin distributed with the surfactant.

[0021] (3) In glossiness adjustment layer this invention, the configuration to which the outermost surface of an ink absorbing layer was made to carry out the laminating of the glossiness adjustment layer is made into one desirable gestalt which raised added value. As for the glossiness adjustment layer, by the media asked for example, for whenever [high gloss], it is desirable that the glossiness by the 60-degree specular gloss test method is ten or more. A glossiness adjustment layer uses as coating liquid (glossiness adjustment layer precursor coating liquid) the binder resin used for example, for the above-mentioned ink absorbing layer, and the charge of an admixture of a pigment, and a laminating is carried out by applying this on the surface of an ink absorbing layer. As binder resin, colloidal silica or a colloidal alumina is suitable as water-soluble acrylic resin and a pigment. glossiness -- the class of binder resin, and the mixing ratio of a pigment -- glossy [inside] by the rate -- it is -- it is possible to make it correspond to the media of fine gloss.

[0022] It is desirable to make binder resin contain five to 50% of the weight to a pigment from a viewpoint which fully holds glossiness, and if the compounding ratio of the binder resin in a glossiness adjustment layer and a pigment is 5 - 30 % of the weight, it is more desirable. In addition, as a basis weight which demonstrates good glossiness, without a glossiness adjustment layer spoiling the function of an ink absorbing layer, 3 - 25 g/m² is desirable, and if it is 5-15g/m², it is more desirable.

[0023] Now, what made the subject the above-mentioned pigment, binder resin, and the improvement component in color stability, and other additives were added if needed and used as coating liquid is applied on a base material, and the laminating of the ink absorbing layer in the medium for ink jet record of this invention is carried out. these ingredients -- image recording grace and the adhesion to a base material -- enough -- a next door -- in addition -- and the viewpoint with which are satisfied of the terms and conditions that the problem on production of the powder omission at the time of cutting processing etc. is avoided to a solid content ratio -- pigment: -- it is desirable to be blended on the basis of additive:1-40% of others 40 - 60 % of the weight and binder resin:20-40% of the weight. although the laminating of the above-mentioned ink absorbing layer and every at least one layer of the glossiness adjustment layers is carried out, either carries out the laminating of them more than two-layer -- you may have -- further -- every [two-layer one] -- or the laminating of every three layers may be carried out.

[0024] Next, how to carry out the laminating of an ink absorbing layer and the glossiness adjustment layer to both sides of a base material is explained. Each above-mentioned ingredient which constitutes an ink absorbing layer is prepared with a proper compounding ratio, into suitable solvents, such as water or alcohol, it is made to dissolve or distribute, these are adjusted, and the coating liquid for ink absorbing layers is obtained. Coating machines, such as blade coater, a roll coater, an air knife coater, bar coater, rod blade coater, and size press, are suitably used by the on-machine or the off machine, and this coating liquid is applied on a base material. As coverage of coating liquid, by the one-layer type, 5 - 30 g/m² is desirable, and if it is 5 - 20 g/m², it is more desirable, for example. Moreover, when carrying out the laminating of the 1st ink absorbing layer on a base material, carrying out the laminating of the 2nd ink absorbing layer and considering as a two-layer type on this, the coverage of the 1st ink absorbing layer has desirable 5 - 30 g/m², and its 5 - 20 g/m² is more desirable. Moreover, the coverage of the 2nd ink absorbing layer has desirable 5 - 15 g/m², and its 5 - 10 g/m² is more desirable. If fewer than this range, ink absorptivity or fixable may be unable to be acquired enough, if many [conversely], problems, such as powder omission, will occur and a fall and cost rise of productivity will be caused. If the coverage of the 2nd ink absorbing layer exceeds 15 g/m² especially, it becomes difficult for ink to pass through the inside of the 2nd ink absorbing layer, a blot is produced, and the clear nature of an image may be spoiled. Thus, it is desirable to control the coverage of the coating liquid for ink absorbing layers with the number of the ink absorbing layers which carry out a laminating. Moreover, calenders, such as a machine calender, TG calender, a supercalender, and a

software calender, may be used and finished after spreading.

[0025] In addition, even if the air permeability of the whole in the phase (it is the preceding paragraph story by the case where the laminating of the glossiness adjustment layer is carried out) which applied the coating liquid for ink absorbing layers on the base material, and carried out coating of the ink absorbing layer is the case where coating of the glossiness adjustment layer is carried out, it is necessary to hold it in fixed level. The air permeability is still more desirable, if the air permeability in the Oken-type air permeability test approach specified to "J. TAPPI paper pulp test-method No.5" is 10 - 4000 seconds more preferably and is 10 - 3000 seconds for 10 to 5000 seconds preferably. Since the air permeability of the last media does not become less than [this], and that to which air permeability exceeds 5000 seconds may cause [of image recording grace, such as causing the fall of ink absorptivity,] a fall, it is not desirable. Moreover, since the reinforcement of this layer falls, peeling and destruction arise, or the fall of the ink absorptivity of the last media is caused and it becomes the cause of a fall of image recording grace also when carrying out the laminating of the glossiness adjustment layer, the above-mentioned air permeability needs to be held.

[0026] Next, the mirror plane drum cast method the approach of carrying out the laminating of the glossiness adjustment layer on an ink absorbing layer is generally learned, for example is mentioned. however, when manufacturing the medium for ink jet record of this invention Apply glossiness adjustment layer precursor coating liquid on the ink absorbing layer which carried out the laminating on the base material, carry out the laminating of the coating solution layer, and a front face is smooth on this coating solution layer. the film (for example, a polyolefin resin film --) chosen according to the glossiness adjustment layer which carries out coating After piling up and sticking a polytetrafluoroethylene resin film, a processed [detachability silicon] resin film, etc. and drying a coating solution layer, the approach of carrying out the laminating of this film by exfoliating is more suitable.

[0027] Even if the coating process and on-machine of an ink absorbing layer perform the laminating of the glossiness adjustment layer to an ink absorbing layer top to coincidence, the coating condition of a glossiness adjustment layer does not become inferior, and deterioration of image recording grace, such as ink absorptivity accompanying it, is not seen. Moreover, if an off machine performs the laminating of a glossiness adjustment layer, it is possible for adjustment of the air permeability of the whole medium etc. to become easier, and to control image recording grace still more minutely.

[0028]

[Example] Next, the example and the example of a comparison based on this invention are shown, and effectiveness of this invention is clarified more. Each of each examples and each examples of a comparison uses a base material as the basis weight of 90.0g/the paper of fine quality of m2, they makes water dissolve or distribute the ingredient of combination shown below, adjusts coating liquid, applies this coating liquid to both sides of a base material, it is made to dry, and carries out the laminating of an ink absorbing layer and the glossiness adjustment layer, respectively, and uses them as the medium for ink jet record. In addition, the ratio of desiccation solid content weight and coverage made the compounding ratio 10.0 g/m2 also with the ink absorbing layer and the glossiness adjustment layer, as long as there was no notice.

[0029]

[The ingredient of an ink absorbing layer]

<An example 1> and binder resin Maleic-acid denaturation PVA Japanese synthetic-chemistry company make: Go SENARU T-350 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray [Co., Ltd.] make: Pamphlet REXX OM-5500 6.0 % of the weight and improvement component in color stability Partial saponification PVA Kuraray [Co., Ltd.] make: Kuraray poval L-9-78 10.0 % of the weight (whenever [saponification] 76.5 - 79.0%, polymerization degree 900)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0030]

<An example 2> and binder resin Maleic-acid denaturation PVA Japanese synthetic chemistry company make : [Go SENARU T-350] 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability The aceto acetyl group denaturation PVA Japanese synthetic chemistry company make : [Go SEFAIMA Z-320] 10.0 % of the weight (whenever [saponification] whenever [92.0 - 94.0%, degrees of polymerization 1400-1500, whenever / aceto acetyl radical denaturation] 4-5-mol %)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0031]

<An example 3> and binder resin Maleic-acid denaturation PVA Japanese synthetic chemistry company make : [Go SENARU T-350] 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Polyvinyl-acetal resin Sekisui Chemical [Co., Ltd.] make: S lek K KW-23 10.0 % of the weight (the degree of acetalization of 27***3%, viscosity of 4000***2000cps of 20% water solution, and residual hydroxyl-group 51 ***three-mol %)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0032]

<An example 4> and binder resin Maleic-acid denaturation PVA Japanese synthetic-chemistry company make: Go SENARU T-350 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray [Co., Ltd.] make: Pamphlet REXX OM-5500 6.0 % of the weight and improvement component in color stability Polyethylene-glycol derivative Asahi Denka Kogyo [K.K.] make: ADEKA PEG PEG-600 10.0 % of the weight (molecular weight 600)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0033]

<An example 5> and binder resin The aceto acetyl group denaturation PVA Japanese synthetic-chemistry company make: Go SEFAIMA Z-320 34.0 % of the weight (whenever [saponification] whenever [92.0 - 94.0%, degrees of polymerization 1400-1500, whenever / aceto acetyl radical denaturation] 4-5-mol %)

- Binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Binder resin, and combination and white pigments Silica gel The Mizusawa chemistry company make : [Ms. KASHIRU P78D] 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical Co., Ltd. make : [SUMIRE gap gin 784S] 10.0 % of the weight and, drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0034]

<An example 6> and binder resin Partial saponification PVA Kuraray [Co., Ltd.] make: Kuraray poval PVA-415 34.0 % of the weight (whenever [saponification] 78.0 - 81.0%, polymerization degree 1500-1600)

- Binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Binder resin, and combination and white pigments Silica gel The Mizusawa chemistry company make : [Ms. KASHIRU P78D] 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical Co., Ltd. make : [SUMIRE gap gin 784S] 10.0 % of the weight and, drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium

chloride S 10.0 % of the weight [0035]

<An example 7> and binder resin Polyvinyl-acetal resin Sekisui Chemical [Co., Ltd.] make: S lek K KW-23 34.0 % of the weight (the degree of acetalization of 27**3%, viscosity of 4000**2000cps of 20% water solution, residual hydroxyl-group 51 **three-mol %)

- Binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Binder resin, and combination and white pigments Silica gel The Mizusawa chemistry company make : [Ms. KASHIRU P78D] 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical Co., Ltd. make : [SUMIRE gap gin 784S] 10.0 % of the weight and, drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0036]

<An example 8> and binder resin Maleic-acid denaturation PVA Japanese synthetic chemistry company make : [Go SENARU T-350] 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Partial saponification PVA Japanese synthetic-chemistry company make: Go SEFAIMA Z-320 5.0 % of the weight (whenever [saponification] whenever [92.0 - 94.0%, degrees of polymerization 1400-1500, whenever / aceto acetyl radical denaturation] 4-5-mol %)

- Improvement component in color stability Polyvinyl-acetal resin Sekisui Chemical [Co., Ltd.] make: S lek K KW-23 5.0 % of the weight (the degree of acetalization of 27**3%, viscosity of 4000**2000cps of 20% water solution, residual hydroxyl-group 51 **three-mol %)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0037]

<An example 9> and binder resin Maleic-acid denaturation PVA Japanese synthetic chemistry company make : [Go SENARU T-350] 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Partial saponification PVA Japanese synthetic-chemistry company make: Go SEFAIMA Z-320 5.0 % of the weight (whenever [saponification] whenever [92.0 - 94.0%, degrees of polymerization 1400-1500, whenever / aceto acetyl radical denaturation] 4-5-mol %)

- Improvement component in color stability Polyvinyl-acetal resin Kuraray [Co., Ltd.] make: Kuraray poval L-9-78 5.0 % of the weight (whenever [saponification] 76.5 - 79.0%, polymerization degree 900)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0038]

<An example 10> and binder resin Maleic-acid denaturation PVA Japanese synthetic-chemistry company make: Go SENARU T-350 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray [Co., Ltd.] make: Pamphlet REXX OM-5500 6.0 % of the weight and improvement component in color stability Secondary alcohol ethoxy rate system surface active agent Asahi Denka Kogyo [K.K.] make: ADEKA toll SO-120 10.0 % of the weight (HLB value 12.0)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0039]

The <example 1 of a comparison>, and binder resin Maleic-acid denaturation PVA Japanese synthetic-chemistry company make: Go SENARU T-350 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray [Co., Ltd.] make: Pamphlet REXX OM-5500 6.0 % of

the weight and improvement component in color stability Partial saponification PVA Kuraray [Co., Ltd.] make: Kuraray poval PVA-117 10.0 % of the weight (whenever [saponification] 98.0 - 99.0%, polymerization degree 1700)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0040]

The <example 2 of a comparison>, and binder resin Maleic-acid denaturation PVA Japanese synthetic chemistry company make : [Go SENARU T-350] 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability The aceto acetyl group denaturation PVA Japanese synthetic-chemistry company make: Go SEFAIMA Z-200 10.0 % of the weight (whenever [saponification] whenever [99.0% or more, a degree of polymerization 1100, whenever / aceto acetyl group denaturation] 4 - five-mol %)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0041]

The <example 3 of a comparison>, and binder resin Maleic-acid denaturation PVA Japanese synthetic chemistry company make : [Go SENARU T-350] 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Polyvinyl-acetal resin Sekisui Chemical [Co., Ltd.] make: S lek K KW-1 10.0 % of the weight (the degree of acetalization of 9***3%, viscosity of 3000**2000cps of 20% water solution, and residual hydroxyl-group 69 ***three-mol %)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0042]

The <example 4 of a comparison>, and binder resin Maleic-acid denaturation PVA Japanese synthetic-chemistry company make: Go SENARU T-350 24.0 % of the weight and binder resin Ethylene-vinyl acetate system emulsion Kuraray [Co., Ltd.] make: Pamphlet REXX OM-5500 6.0 % of the weight and improvement component in color stability Polyethylene-glycol derivative Asahi Denka Kogyo [K.K.] make: ADEKA PEG PEG-20000 10.0 % of the weight (molecular weight 20000)

- White pigments Silica gel The Mizusawa chemistry company make: Ms. KASHIRU P78D 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical [Co., Ltd.] make: SUMIRE gap gin 1001 10.0 % of the weight and drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0043]

The <example 5 of a comparison>, and binder resin The aceto acetyl group denaturation PVA Japanese synthetic-chemistry company make: Go SEFAIMA Z-200 34.0 % of the weight (whenever [saponification] whenever [99.0% or more, a degree of polymerization 1100, whenever / aceto acetyl group denaturation] 4 - five-mol %)

- Binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Binder resin, and combination and white pigments Silica gel The Mizusawa chemistry company make : [Ms. KASHIRU P78D] 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical Co., Ltd. make : [SUMIRE gap gin 1001] 10.0 % of the weight and, drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0044]

The <example 6 of a comparison>, and binder resin Partial saponification PVA Kuraray [Co., Ltd.]

make: Kuraray poval PVA-117 34.0 % of the weight (whenever [saponification] 98.0 - 99.0%, polymerization degree 1700)

- Binder resin Ethylene-vinyl acetate system emulsion 6.0 % of the weight Kuraray [Co., Ltd.] make: Pamphlet REXX OM-5500 and improvement component in color stability Binder resin, and combination and white pigments Silica gel The Mizusawa chemistry company make : [Ms. KASHIRU P78D] 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical Co., Ltd. make : [SUMIRE gap gin 1001] 10.0 % of the weight and, drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0045]

The <example 7 of a comparison>, and binder resin Polyvinyl-acetal resin Sekisui Chemical [Co., Ltd.] make: S lek K KW-1 34.0 % of the weight (the degree of acetalization of 9***3%, viscosity of 3000**2000cps of 20% water solution, residual hydroxyl-group 69 ***three-mol %)

- Binder resin Ethylene-vinyl acetate system emulsion Kuraray Co., Ltd. make : [Pamphlet REXX OM-5500] 6.0 % of the weight and improvement component in color stability Binder resin, and combination and white pigments Silica gel The Mizusawa chemistry company make : [Ms. KASHIRU P78D] 40.0 % of the weight and cationic color fixing agent Polyamine system color fixing agent Sumitomo Chemical Co., Ltd. make : [SUMIRE gap gin 1001] 10.0 % of the weight and, drugs for light-fast improvement Water-soluble metal salt more than divalent Tomita Phamarceutical [Co., Ltd.] make: Magnesium chloride S 10.0 % of the weight [0046] The above is the ingredient of the ink absorbing layer of examples 1-10 and the examples 1-7 of a comparison, and all the ingredients of the glossiness adjustment layer which carries out coating on the ink absorbing layer which consists of these ingredients presupposed that it is common. The ingredient is as follows.

[The ingredient of a glossiness adjustment layer]

- Binder resin Maleic-acid denaturation PVA Japanese synthetic-chemistry company make: Go SENARU T-350 10.0 % of the weight and white pigments Colloidal silica Nissan Chemical Industries [, Ltd.] make: Snow tex UP 45.0 % of the weight Nissan Chemical Industries [, Ltd.] make: Snow tex XL 45.0 % of the weight [0047] When evaluation objects, such as a color patch, were printed using the commercial ink jet printer (Seiko Epson make-M-750C) to the medium for ink jet record of the above-mentioned examples 1-7 and the examples 1-7 of a comparison, all were able to obtain the good printing image. Evaluation of color stability and image shelf lives (lightfastness, a water resisting property, moisture resistance, etc.) was performed by the following approach using this image. [0048] (1) The medium for ink jet record of the examples 1-7 which printed the color stability color patch (the black OD value 1.0 or 0.6), and the examples 1-7 of a comparison was left in temperature:26 degree C and the interior of a room which made air conditioning relative humidity:55%, and was made into the evaluation sample of color stability. Under air conditioning, the color difference 24 hours immediately after printing calculated from the value of L* and a* which were measured using the spectrophotometer (GretagMacbeth make: GRETAG SPM50), and b*, after printing, and of 48 hours and 72 hours after was set to deltaE, and color stability was evaluated as follows from the value of deltaE.

A: 48 hours after, the value of deltaE turns into about 1 constant value less than by three.

B: 72 hours after, the value of deltaE becomes almost fixed by 3-4.

C: The value of deltaE exceeds 4 and is rising also after 72 hours.

[0049] In addition, by this invention, color stability defines as good that from which deltaE after 2 or less and 48-hour progress becomes [deltaE after 24 hour progress of the dark gray which tends to be recognized by the color which is different as an impression, or light gray (OD value is 1.0 or 0.6 with black)] about 1 constant value or less by three. And deltaE exceeds 4 and color stability defines the case where deltaE is in an expansion inclination also after 72-hour progress as poor.

[0050] (2) The exposure test of 30 kJ/m² was performed on condition that the black panel temperature of 63 degrees C, 50% of relative humidity, and 340nm UV irradiation on-the-strength 0.35 W/m² using lightfastness and light-fast 1 (concentration survival rate) xenon weatherometer (the product made from ATLAS: Ci-5000). Subsequently, the reflection density of M (Magenta) was measured using the spectrophotometer (GretagMacbeth make: GRETAG SPM50), and the lightfastness equivalent to a concentration survival rate was evaluated as follows.

A: It exceeds 90% before the concentration after exposure being exposed.

B: 80 - 90% before the concentration after exposure being exposed.

C: Less than 80% before the concentration after exposure being exposed.

[0051] - The exposure test of 30 kJ/m² was performed to the medium for ink jet record itself on condition that the black panel temperature of 63 degrees C, 50% of relative humidity, and 340nm UV irradiation on-the-strength 0.35 W/m² using light-fast 2 (optical xanthochroism) xenon weatherometer (the product made from ATLAS: Ci-5000). Subsequently, the color difference exposure before calculated from the value of L* of a medium own [for ink jet record] measured using the spectrophotometer (GretagMacbeth make: GRETAG SPM50), a*, and b* and after exposure was set to deltaE, and extent of optical yellowing was evaluated as follows from the value of deltaE.

A: The value of deltaE is less than five.

B: The value of deltaE is 5-10.

C: The value of deltaE exceeds 10.

[0052] - After leaving the color patch of Y (yellow), M (Magenta), C (cyanogen), and Bk (black) for about one month in light-fast 3 (concentration survival rate) south sense and a glass through a window, the average of a concentration survival rate was measured and it evaluated as follows.

A: It exceeds 90% before the concentration after neglect leaving it.

B: 80 - 90% before the concentration after neglect leaving it.

C: Less than 80% before the concentration after neglect leaving it.

[0053] - The color patch of R (red), G (Green), and B (blue) was left for about one month in light-fast 4 south sense and a glass through a window. subsequently, the color difference neglect before calculated from the value of L* and a* which were measured using the spectrophotometer (GretagMacbeth make: GRETAG SPM50), and b*, and after neglect -- deltaE -- carrying out -- R, G, and B -- the average of each deltaE was evaluated as follows.

A: The average of deltaE is less than five.

B: The average of deltaE is 5-10.

C: The average of deltaE exceeds 10.

[0054] (3) After sticking the printing sample (portrait image) of the medium for ink jet record on the office wall about 2m away from the indoor shelf-life north sense aperture and leaving this for six months, viewing estimated indoor shelf life as follows.

A: It does not turn out that the color changed compared with the first stage.

B: It turns out that the color changed compared with the first stage.

[0055] (4) After having contained to the clear file (CL-A420) by clear file shelf-life Mitsubishi Pencil Co., Ltd. so that the medium for ink jet record might be protruded about 2cm, and saving for two weeks under 60 degrees C at it, color difference deltaE after the first stage and neglect (based on CIE L*a*b*) estimated extent of yellowing as follows.

A: Less than deltaE2

B: deltaE is 2-5.

C: deltaE exceeds 5.

[0056] (5) the color mixture bleeding and the monochrome in an ink absorptivity ink jet printer -- it oozed and viewing estimated extent of ** as follows as compared with pure glossy paper (Seiko Epson make: glossy paper (thick opening) photograph print paper only for super fine one). In addition, the difference of a SCID image is highly minute color digital standard image data, and it compares about N1 portrait image of ISO/JIS-SCID (based on JIS X9201-1995), or N3 fruit cage image.

A: Excel satisfactory practically completely (pure glossy paper and more than an EQC).

B: Excel practically satisfactory (although it is inferior to pure glossy paper a little, the difference in a SCID image is not known).

C: It is inferior practically (there is also a difference in a SCID image).

[0057] (6) Printed the alphabetic character of the image water resisting property Y (yellow), and M (Magenta), C (cyanogen), R (red), G (Green), B (blue) and Bk (black), the water of one drop of syringe was made to adhere to a printing part, and the condition after making this season naturally was evaluated as follows.

A: There is no outflow of a color.

B: Decipherment is possible although there is outflow of a color.

C: Decipherment is impossible.

[0058] (7) Three day and night of samples which printed the color patch of the image moisture resistance Y (yellow), and M (Magenta), C (cyanogen), R (red), G (Green), B (blue) and Bk (black) were exposed to 40 degrees C and 85% of high-humidity condition, and image moisture resistance was evaluated as follows from the blot condition of the formation of a dark color of a color patch, and a profile.

A: Excel satisfactory practically completely (there are not formation of a dark color and a profile blot).

B: Excel practically satisfactory (there is a blot of extent a little).

C: It is inferior practically.

[0059] (8) The water of 5mL(s) was hung down to the waterproof ink absorbing layer of an ink absorbing layer, the ink absorbing layer produced by rubbing a it top broke, ***** etc. was investigated, and it evaluated as follows.

A: Excel (an ink absorbing layer breaks and ***** etc. is not accepted).

B: Excel practically satisfactory (the image is held although peeling of an ink absorbing layer is accepted a little).

C: There is a problem practically (an ink absorbing layer will break and it will separate completely).

[0060] (9) The water of 5mL(s) was hung down to the waterproof glossiness adjustment layer of a glossiness adjustment layer, the glossiness adjustment layer produced by rubbing a it top broke, ***** etc. was investigated, and it evaluated as follows.

A: Excel (a glossiness adjustment layer breaks and ***** etc. is not accepted).

B: Excel practically satisfactory (peeling of a glossiness adjustment layer is accepted a little).

C: There is a problem practically (a glossiness adjustment layer will break and it will separate completely).

[0061] The evaluation result of examples 1-7 is shown in Table 1, and the evaluation result of the examples 1-7 of a comparison is shown in Table 2.

[0062]

[Table 1]

	実施例1	2	3	4	5	6	7	8	9	10
色安定性	B	A	A	B	A	A	A	A	A	B
耐光性1	A	A	A	A	A	A	A	A	A	A
耐光性2	A	A	A	A	A	A	A	A	A	A
耐光性3	A	A	A	A	A	A	A	A	A	A
耐光性4	A	A	A	A	A	A	A	A	A	A
室内保存性	A	A	A	A	A	A	A	A	A	A
クリアファイル 保存性	A	A	A	A	A	A	A	A	A	A
インク吸収性	A	A	A	A	A	A	A	A	A	A
画像耐水性	A	A	A	A	A	A	A	A	A	A
画像耐湿性	A	A	A	A	A	A	A	A	A	A
インク受容層 耐水性	A	A	A	A	A	A	A	A	A	A
光沢度調整層 耐水性	A	A	A	A	A	A	A	A	A	A

[0063]

[Table 2]

	比較例1	2	3	4	5	6	7
色安定性	C	C	C	C	C	C	C
耐光性1	B	B	B	B	B	B	B
耐光性2	B	B	B	B	B	B	B
耐光性3	B	B	B	B	B	B	B
耐光性4	B	B	B	B	B	B	B
室内保存性	A	A	A	A	A	A	A
クリアファイル 保存性	A	A	A	A	A	A	A
インク吸収性	A	A	A	A	A	A	A
画像耐水性	A	A	A	A	A	A	A
画像耐湿性	A	A	A	A	A	A	A
インク受容層 耐水性	A	A	A	A	A	A	A
光沢度調整層 耐水性	A	A	A	A	A	A	A

[0064] According to Table 1, although the medium for ink jet record of an example has evaluation of B in a part, it shows high level from having obtained evaluation of A in general, and it is excellent in image recording grace and color stability, and it turns out that it is satisfactory at all practically. On the other hand, according to Table 2, it turns out that especially the medium for ink jet record of the example of a comparison is inferior to an example in color stability. Therefore, it was proved that the improvement component in color stability contained in the ink absorbing layer of this invention is very effective.

[0065]

[Effect of the Invention] As explained above, the effectiveness that it can respond also to a high-speed printing technique since it is excellent in image recording grace, such as printing concentration, ink absorptivity, and image shelf lives (lightfastness, a water resisting property, moisture resistance, etc.), since this invention contains the specific improvement component in color stability all over an ink absorbing layer, and its color stability is very promising as a good medium for ink jet record and it is excellent in ink absorptivity further is done so.

[Translation done.]